REMARKS

Claims 24-39, 54-61, 63-71, and 73-75 are currently pending in the present application, including independent claims 24 and 32. Independent claim 24, for example, is directed to a method for reducing odor. The method comprises mixing the salt of a transition metal with silica particles to form a transition metal / silica particle mixture; selectively adjusting the pH of the mixture to 7 or greater so that modified silica particles are formed that contain the silica particles bonded with the transition metal, wherein the mole ratio of the transition metal to the silica particles is at least about 10:1. The modified silica particles are contacted with an odorous compound. The transition metal provides one or more active sites for capturing the odorous compound.

In the Office Action, independent claim 24 was rejected under *35 U.S.C. § 103(a)* as being obvious over U.S. Patent No. 5,486,356 to Yim in view of U.S. Patent No. 5,380,510 to Matsui, et al. Yim is directed to a deodorant that comprises a carrier which comprises silica gel, MgO, talc, and a transition metal oxide or alloy. The carrier is dipped into an aqueous solution containing 0.1-2 moles per liter of a dissolved catalytic metal complex compound. 0.2-1% by weight based on the weight of the carrier of the catalytic metal is adsorbed onto the carrier. (Col. 2, ll. 49-54.)

Applicants have amended independent claim 24 to include the limitations of previous dependent claim 62. Independent claim 24 now contains the limitation that the mole ratio of the transition metal to the silica particles is at least about 10:1. Additionally, Applicants have amended independent claim 24 to include the limitation that the silica particles are bonded with the transition metal. The Office Action rejected

previous dependent claim 62 stating "it would have been obvious to . . . find an optimum metal/silica ratio." Applicants respectfully disagree.

Presumably, the Office Action equates the catalytic metal adsorbed on the carrier with Applicants' claimed modified silica particles as the Office Action states "wherein the catalytic metal is covalently bonded." While Applicants disagree with this opinion, even if true, Yim teaches away from a metal to silica particle ratio of at least about 10:1. Yim teaches that 0.2-1% by weight based on the weight of the carrier of the catalytic metal is adsorbed on the carrier. Col. 2, lines 49-55. Furthermore, Yim teaches that the carrier is constructed of 20-50% by weight of silica gel. Col. 2, lines 17-18.

Utilizing the above numbers, a mole ratio of catalytic metal to silica may be computed. Assuming a carrier weight of 100 grams[1], the carrier contains a minimum of 20 grams[2] of silica gel. Anhydrous silica gel (SiO_2)[3] has a molecular weight of approximately 60 grams/mole. As such, 20 grams of silica gel is equal to about 0.3333 moles. If 1% by weight based on the weight of the carrier of the catalytic metal[4] is adsorbed, then 1 gram of catalytic metal is adsorbed. The lowest molecular weight catalytic metal disclosed in Yim is Iron (Fe) with a molecular weight of 55.8 grams per mole.[5] Thus, 1 gram of catalytic metal is equal 0.0179 moles. Thus, the highest catalytic metal to silica mole ratio disclosed in Yim is 0.0537:1. Therefore, Applicants

[1] Any total weight for the carrier may be used. The final mole ratio will be the same.
[2] The lowest amount of silica is utilized since that would yield the highest metal to silica mole ratio.
[3] Applicants note that "silica gel" may contain varying amounts of water. Since Applicants claim a mole ratio of transition metal to silica particles (i.e., not silica particles plus water), anhydrous silica gel is assumed for the following calculations. However, even if the silica gel of Yim contains unknown amounts of water (thus, lowering the total moles of silica), it is believed the difference would not be substantial.
[4] The highest percentage of metal is used since that would yield the highest metal to silica mole ratio.
[5] The lowest molecular weight metal is used since that would yield the highest metal to silica mole ratio.

claimed 10:1 ratio is over 180 times higher than the highest catalytic metal to silica mole ratio possible in Yim.

Furthermore, Applicants submit that it would not be obvious to modify Yim to obtain a mole ratio of 180+ times higher. Yim teaches:

> The aqueous catalytic metal complex compound solution can be saturated or dilute as long as the carrier immersion time and catalytic metal complex compound concentration are managed to preferably provide an amount of catalytic metal adsorbed on the carrier which is 0.2-1 percent by weight based on weight of the carrier. Col. 2, lines 49-54.

Thus, the controlled variables (catalytic metal concentration and carrier immersion time) are managed to only allow 0.2-1% by weight of the catalytic metal to be adsorbed.

Additionally, Yim discloses 6-30% by weight of transition metal oxide or alloy is present in the carrier. Yim does not teach that the transition metal present in the carrier is bonded with the silica particles. However, even if the transition metal present in the carrier could be bonded with the silica in order to yield Applicant's claimed modified silica particles, the mole ratio of metal to silica would still be an order of magnitude too low to reach Applicants' claimed range. Again assuming a carrier weight of 100 grams, the largest amount of transition metal present would be 30 grams.[6] The lowest molecular weight transition metal disclosed in Yim is Titanium (Ti) with a molecular weight of 47.9 grams per mole.[7] Thus, 30 grams of titanium is equal to 0.626 moles. If that were added to the 0.0179 moles of catalytic metal above, 0.644 moles of metal would be present compared to 0.333 moles of silica yielding a ratio of 1.9:1.

[6] The largest amount of transition metal is utilized to yield the largest metal to silica mole ratio.
[7] The lowest molecular weight transition metal is utilized to yield the largest metal to silica mole ratio.

Applicants note that the above arguments illustrating the vast differences between Applicants claims and the disclosure of Yim is by no means an admission that the silica and the transition metal and/or catalytic metal of Yim can somehow be combined in order to yield Applicants' claimed modified silica particles that contain silica particles molecularly bonded with a transition metal wherein the molecular bonding comprises covalent or coordinate bonds. Applicants simply illustrated the computations above in order to demonstrate the extreme difference between Yim and Applicants' claims.

Matsui, et al. fails to remedy the deficiencies of Yim noted above. Matsui, et al. is cited as disclosing "selectively adjusting the pH of said mixture to 7 or greater so that modified silica particles are formed." Applicants respectfully disagree and incorporate by reference their arguments noted in the Response filed on September 27, 2007 and the Pre-Appeal Request for Review filed on November 28, 2007.

Independent claim 32 was also rejected in the Office Action under *35 U.S.C. § 103(a)* as being obvious over Yim in view of Yu, et al. (U.S. Patent No. 6,111,010). As correctly noted in the Office Action, Yim fails to disclose coupling a transition metal to a surface of silica particles with an organofunctional silane so that modified silica particles are formed. Yu, et al. is directed to an aqueous solution that contains the reaction product of a polyisocyanate and amino-functional alkoxysilane for use as a binder, adhesive, or sealant.

Applicants have amended independent claim 32 to include the limitations of previous dependent claim 72. Independent claim 32 now contains the limitation that the mole ratio of the transition metal to the silica particles is at least about 10:1.

Additionally, Applicants have amended independent claim 32 to include the limitation that the silica particles are bonded with the transition metal.

For the reasons noted above, Yim fails to disclose Applicants' claimed limitations. Yu, et al. fails to remedy these limitations. Furthermore, the Office Action asserted that it would have been obvious to "use the aminofunctional alkoxysilane . . . in the silica production of Yim because Yu discloses the alkoxysilane in a process for making compositions comprising colloidal silica." Applicants respectfully disagree with this assertion as independent claim 32 requires coupling of a transition metal to a surface of silica particles with an organofunctional silane. Applicants elaborated extensively on this argument in the Response After Final filed on September 27, 2007, and the Pre-Appeal Request for Review filed on November 28, 2007, each of which are incorporated by reference.

Thus, for at least the reasons set forth above, Applicant respectfully submits that independent claims 24 and 32 patentably define over the cited references. Further, at least for the reasons indicated above relating to corresponding independent claims 24 and 32, the corresponding dependent claims also patentably define over the references cited. However, the patentability of the dependent claims certainly does not hinge on the patentability of the independent claims. In particular, it is believed that some or all of these claims may possess features that are independently patentable, regardless of the patentability of the independent claims.

Applicant respectfully submits that the present application is in complete condition for allowance and favorable action, therefore, is respectfully requested.

Examiner Johnson is invited and encouraged to telephone the undersigned, however, should any issues remain after consideration of this Amendment.

Please charge any additional fees required by this Amendment to Deposit Account No. 04-1403.

Respectfully requested,

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